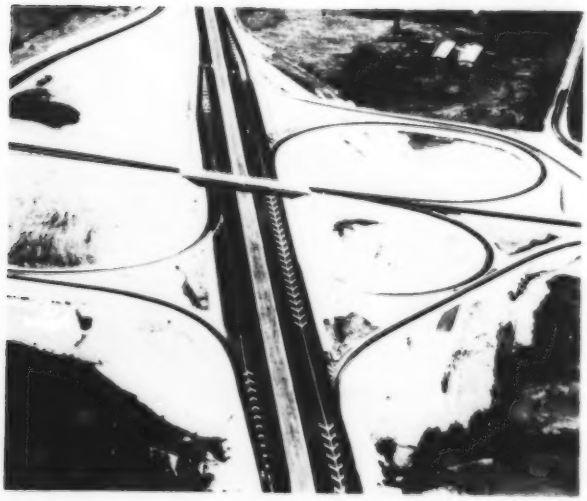

Frontier to Freeway

Province of British Columbia
Ministry of Transportation and Highways

FRONTIER TO FREEWAY

A HISTORY
OF HIGHWAYS IN
BRITISH COLUMBIA

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Frontier to Freeway

A HISTORY OF HIGHWAYS IN BRITISH COLUMBIA

Travel in British Columbia in the early days was a story of men with a purpose pushing through heavy forest, climbing sheer canyon walls, and finding hidden passages through seemingly impassable mountain ranges. Fighting cold, loneliness, bleak wilderness, and even one another, they forged hard won paths to reach gold fields and fertile valleys.

In most of the province, the original trail builders were Indians. They were followed by explorers and fur traders from the Hudson's Bay Company and the North West Fur Trading Company. Then came the Gold Rush of the mid-1800s, and the mad dash for riches made road-building such an urgent necessity that many difficult natural obstacles were overcome.

The trails blazed then were the forerunners of today's highways which span the wide interior plains of British Columbia, climb the mountains, and skirt the inland waterways.

One of the most famous of the early roads was the Cariboo Highway, built by the Royal Engineers in 1862-63. Today it follows the same route over which 20-mule-team freight wagons drove more than 100 years ago.

Historian Judge Howay described the Cariboo Highway this way:

> *"Reaching from Yale, the head of navigation, to the mines of the Cariboo, a distance of nearly 400 miles, and solidly and substantially constructed by our infant colony in less then three years, this road was the pride of British Columbia, and a source of wonder and admiration to its visitors, who were loud in their expressions of surprise at the daring conception and skillful execution of the work..."*

93-00353/

The development of British Columbia's road system can be traced through seven phases.

This picture, taken in the 1860s, shows the Cariboo Road in the Fraser Canyon.

The seven development phases overlapped in time, but each was distinct and a response to different social factors and challenges.

PHASE I: INDIAN TRAILS

The perception of the primitive Indian picking berries or sitting by a stream waiting for salmon is a fallacy. The fact is, life for these neolithic food gatherers was full of toil, and their social system and culture were very sophisticated. Trade was an important part of their way of life because not all their needs could be satisfied locally. For instance, the interior Indians had to get their salt from the coast, and obsidian for arrowheads and spearheads came from Mount Waddington. Trade meant that they needed to build trails.

The terrain required that many of the trails built include structures to overcome obstacles. Sometimes, this involved something as simple as a log felled to cross a creek. Other times, more complex timber structures such as stairways and dry bridges were needed.

The most elaborate such structure was probably the famed Hagwilget Bridge over the Bulkley River at Hazelton in northern British Columbia. This bridge, constructed of wooden poles tied together by telegraph wire, supported a 1.8-m (6 foot) wide pathway across a span of 45.7 m (150 feet), joining cliffs some 30.5 m (100 feet) above the river. For nearly 50 years, this bridge carried a stream of hunters, prospectors, traders, explorers, and settlers across the deep canyon.

The bridge was partly made possible by a white man's failure. An engineer named Colonel Bulkley was commissioned to build an overland telegraph line to Europe via the United States, British Columbia, the Aleutians and Siberia. The venture was given up with the laying of the first Atlantic cable. The miles of telegraph wire meant for the ill-fated line were dumped and abandoned in the Hazelton area. And it was this line the Indians of Hagwilget used to tie poles together when they built the famous bridge.

PHASE 2: FUR TRAILS

The second phase in the development of the road system of British Columbia began with the arrival of the land-based fur traders in 1805. The fur or "brigade" trails, as they were sometimes known, were used by traders to bring in supplies and pack out furs, west to the sea, or east to the Northwest Territories. Some of the trails used were existing Indian paths; some were new trails along routes seldom used by the Indians. Water routes also played a part in these fur trails. On land, the fur traders cleared trees and brush but did little bridge construction.

Hagwilget Bridge over the Bulkley Canyon was the earliest known bridge of any size in British Columbia.

PHASE 3: GOLD TRAILS

Settlement in British Columbia was sparse until the 1840s. Although Europeans had visited the coast regularly since Captain Cook's arrival in 1778, and there had been intermittent settlement at Nootka since 1788, it wasn't until 1805 that land-based traders first began to settle permanently at Fort Nelson and Fort McLeod. Government at the time was administered by the Hudson's Bay Company.

In 1850, Richard Blanshard was appointed governor, but he left the colony a year later after finding that the traditional authority of the Hudson's Bay Company was stronger than his own as governor. James Douglas, a veteran employee of the Hudson's Bay Company, succeeded Blanshard.

(Top left) Edgar Dewdney was a major roadbuilder in the Colony of British Columbia. In 1872, he was elected to the House of Commons from the Yale riding. In 1879, he became the Indian Commissioner for the Northwest Territories; was appointed Lieutenant–Governor and Commissioner of the Territories in 1881; and from 1888 to 1892 was the Dominion representative for East Assiniboia (Manitoba). After serving as Lieutenant–Governor of British Columbia from 1892 to 1897, he worked as a mining broker in Victoria until his death.

(Top right) Richard Clement Moody was the first Chief Commissioner of Lands and Works in the Colony of British Columbia, and served as Lieutenant–Governor from 1858 to 1863. He was also a Colonel in the Royal Engineers. Following his service in British Columbia, he returned to England and was promoted to the rank of Major General in 1866. He died on March 31, 1877. (Photo courtesy Provincial Archives, Victoria, B.C.)

(Bottom) The Royal Engineers. 1858 to 1863

The illustration shows a sergeant and two sappers. Dress for the officer was a scarlet tunic with dark blue trousers featuring a scarlet strip along the seams; yellow cord on the shoulder straps, collar and sleeve cuffs; blue collar and cuffs; blue pill–box hat with a yellow band and red piping; and a buff white belt. The sappers wore grey shirts with their uniform.

On October 29, 1858, Secretary of State Lytton instructed Colonel Moody "to regard with a military eye the best position for such towns and cities as for the engineering of roads and passes or laying the foundation of any public works ... All that belongs to comprehensive survey and public works must belong to the labour of the Royal Engineers."

The sappers received a mixed allowance for their work on the Harrison to Lillooet road in 1859 - 10 per cent in cash, 10 per cent in rations valued at $1 per day, 80 per cent in rural land around Queensborough (New Westminster), and free passage from that city to Port Douglas on the northeast end of Harrison Lake.

Early expenditures for transportation were on trails and roads in the vicinity of Victoria, largely to serve the farming settlement. The mainland was still primarily fur country, but mining was also starting to become important. By this time, coal was being mined at Nanaimo, and small quantities of gold were being mined by the Thompson River Indians. Word of this soon spread, and by 1857 miners began pouring into the Fraser Canyon country.

The loss of the Columbia River country was a lesson that was taken to heart. Governor Douglas concluded that positive steps were needed to preserve the mainland for the British Crown. One such step was to develop adequate trails north of the 49th parallel to provide greater accessibility than American routes did to the mining areas. The first such trails were constructed between 1858 and 1861, from Spuzzum to Yale (the head of navigation on the Fraser), Hope to Similkameen (towards the Rock Creek goldfields) and Harrison to Lillooet (to access the Cariboo and Thompson River).

PHASE 4: WAGON ROADS

While the gold trails served their purpose well and played a large part in keeping the mainland British, it soon became evident to Governor Douglas that their usefulness in moving freight was limited because of the cost involved.

A start was made on improving the land sections of the Harrison-Lillooet Trail to wagon road calibre, but the route was soon abandoned because the Trail included four water sections and a short horse-drawn railway at Seton Portage, both of which greatly increased the cost of handling freight.

The Governor's next decision was to develop the Cariboo wagon road from Yale. The work took three years, but at 5.5 m (18 feet) wide, the completed road to Barkerville was adequate for two teams to pass.

Freighting on the Cariboo Road around 1870. The wagon road was built by Royal Engineers and traversed sections of the rugged Fraser and Thompson canyons.

Other wagon roads followed, notably North Road from New Westminster to Port Moody (built by Royal engineers), and in 1861 the first 49 km (25 miles) of a road from Hope to Skagit. The latter was the first and last section of a wagon road to the Rock Creek goldfields. The need for this road passed, as the Rock Creek rush petered out and the miners headed for the Cariboo. In 1866, another wagon road was built from Cache Creek to Savona, providing access to the Columbia River goldfields above Revelstoke.

Interestingly, while the emphasis until about 1870 was on building roads to gold mines, the first wagon road was in fact Craigflower Road in Victoria, built in 1854 to connect agricultural areas.

PHASE 5: TRUNK ROADS

By the time the depression of 1866 hit, it was obvious that furs and gold were not an adequate base for on-going prosperity. It was also felt that the road work of the previous two decades, done in response to specific needs, hadn't produced a coherent network that would assist the province in general development, particularly agricultural settlement.

In 1873, the Province of British Columbia, under Chief Commissioner of Works Robert Beaven, embarked on a new policy to encourage agricultural settlement and logging.

The development of trunk roads was considered an essential element of this policy.

Two photos of the Cariboo Road in the Fraser Canyon, built by the Royal Engineers in the 1860s.

After the Cariboo Road, the first elements constructed in the trunk system were a road from Savona to Kelowna, and another from New Westminster to Hope via Langley and Sumas. Soon after, roads were built from Victoria to Nanaimo, Kamloops to Nicola, O'Keefe to Enderby, and Nicola to Spence's Bridge.

Because of the tremendous cost involved in building roads to cover the great distances in the province, the trunk network took many decades to come to full fruition. In fact, it could be said to be incomplete even today. In addition, the good start made on the trunk system was held in suspension in the 1880s when the province was caught up by railway fever. The building of the CPR destroyed portions of the Cariboo Road in the Fraser Canyon, and building of the CNR in the 1910s destroyed more. As a result, the Fraser Canyon section of the road was not reopened until 1926.

PHASE 6: MODERN ENGINEERED HIGHWAYS

Building of roads in various parts of the province proceeded slowly during the early part of the 20th century and there was no cohesive system. It was impossible to cross the province by road, and the only route into the central and northern interior was the Cariboo Road, very much in the same form in the 1920s as it had been in the 1800s.

For British Columbia, as for most parts of North America, the 1920s could be called the real start of the automobile age. In 1920, there were 28,000 motor vehicles registered in British Colum-

bia. By 1925, this had grown to 56,427. The total reached 98,038 in 1930, and there it stayed until 1935 . At that point, automobile buying was further curtailed by the depression.

In the 1930s, a fair amount of hard surface paving was done, but it didn't keep pace with demand and many long sections of major routes remained unpaved. Between 1939 and 1945, as vehicle registrations inched up to 135,000, little paving was carried out. Then, after 1945, increasing prosperity brought an explosive increase in automobile ownership and travel, making it all too obvious that the standards of much of the trunk system were inadequate to meet the needs of modern automobiles, buses and trucks.

By 1950, there were 270,000 vehicles. By 1959, the total rose to 541,363. It was not until after the Second World War that any attempt was made to bring the various isolated parts of British Columbia together by road.

Thus started a modern age of highway building to match the phenomenal growth of the province's economy, its population, and its motor vehicle registration.

In the 1950s and '60s, a major program was launched to upgrade alignment and pave the rural trunk system. The federal government participated financially in the Trans-Canada Highway and some northern roads, but the assistance was small compared with the expenditure covered by the province.

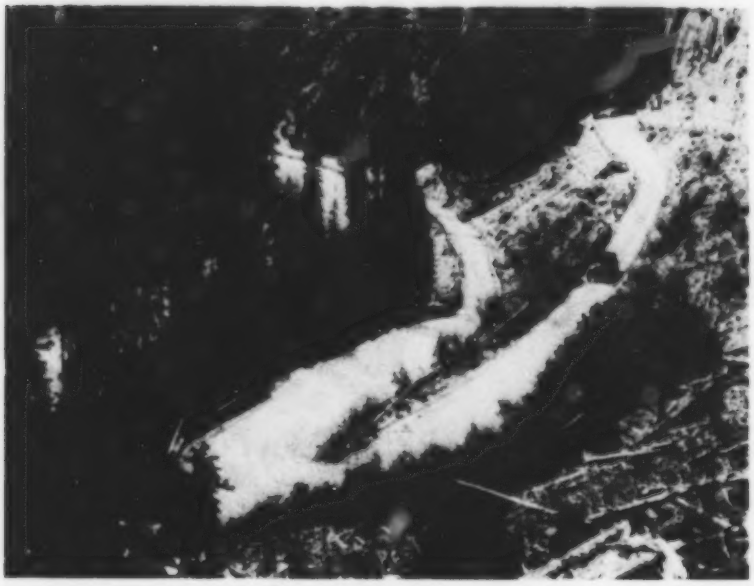
PHASE 7: MULTI-LANE HIGHWAYS

By the 1950s, traffic volume began taxing the capacity of the province's two-lane urban road system. The multi-lane phase began, overlapping with continuing development of "modern highways" in less heavily travelled parts of the province.

Multi-laning first began in the Vancouver area with the Burnaby and Vancouver/Blaine freeways and associated major structures such as Second Narrows, Port Mann and Oak Street Bridges, and the Massey (Fraser River) Tunnel. Other more conventional facilities such as the Lougheed Highway and Southwest Marine Drive were also multi-laned. Some cities, especially Vancouver and Victoria, had multi-lane streets for some time.

Currently, several rural highways are being multi-laned, including parts of the Trans-Canada, Island, Lougheed and Okanagan Highways. Because of increasing traffic, it is expected that this construction phase will continue for some time.

Bridges figured significantly in the early wagon roads. The elaborate truss bridge shown was over the Thompson River. The suspension bridge built in 1863 was the first of three Alexandra Bridges to be built over the Fraser River, about 22.5 km north of Yale. The first bridge (shown) was replaced in 1926 by a newer suspension bridge, and the present steel arch span was completed in 1962.



Switchback motor road on the way to Yoho Valley, Yoho National Park, 1920s. (Provincial Archives, Victoria, B.C.)

Motoring on the Malahat near Victoria in 1918. (Provincial Archives, Victoria, B.C.)

Rogers Pass on Highway 1, passing below the Tuppers, in Glacier National Park.

Mathews Road Interchange on the Deas Island Throughway.

Paying for the road system has gone through many changes over the years.

The first official appropriation for road building was $500 in 1854. By 1954, the appropriation had risen to $36 million. By 1984, it was $570 million, and in 1989 it was more than $1 billion.

The first appropriation was raised mainly by a tax on liquor, but this was inadequate to cover the heavy expenditures in the wagon road phase and later phases.

Bond issues and tolls paid for the Cariboo Road, and the tolls remained in place for many years. Some of the tolls were collected directly by the contractors building particular sections of the road, as part of the payment for their work.

From 1860 to 1866, statute labour was required even though the original English law had been repealed many years before. Under this system, settlers had to spend six days a year on road work for no pay, or pay an indemnity of 6s 3d per day. This unpopular measure was repealed in 1866 and replaced with a road tax of $2 per year from each resident male and non-resident property owner. Arrears were charged at 18 per cent interest.

Tolls were again revived in the 1950s to assist in constructing large, expensive bridges and tunnels, but were removed in the 1960s. An exception is the Coquihalla Highway, which has had tolls since its opening in 1986. The money collected goes to the province's general revenue from which, since the 1950s, highways expenditures are drawn.

With the development of the road system came the need for a Ministry to be in charge of it.

1858-1863	Col. R.C. Moody
1863	C. Brew
1864-1871	J.W. Trutch
1871	B.W. Pearse
1871	H. Holbrook
1872	G.A. Walkem
1872-1876	R. Beaven
1876-1878	F.G.Vernon
1878-1882	G.A. Walkem (also Premier)
1882	R. Beaven (also Premier)
1883-1887	W. Smithe (also Premier)
1887-1895	F.G. Vernon
1895-1898	G.B. Martin
1898	C.A. Semlin (also Premier)
1899	F.L. Carter-Cotton
1900	J.S. Yates
1900-1903	W.C. Wells
1903	R. McBride (also Premier)
1903-1906	R.F. Green
1906	R.G. Tatlow
1907-1908	F.J. Fulton
1908-1914	T. Taylor
1914-1915	C.E. Tisdall
1915-1921	J.H. King
1921-1927	W.H. Sutherland
1927-1929	N.S. Lougheed
1929-1932	R.W. Bruhn
1932-1933	R.H. Pooley
1933-1939	R.M. MacPherson
1939-1941	C.S. Leary
1941-1945	H. Anscomb
1945-1952	E.C. Carson
1952-1968	P.A. Gaglardi
1968	W.A.C. Bennett (also Premier)
1968-1972	W.D. Black
1972-1973	R.M. Strachan
1973-1975	G.R. Lea
1975-1986	A.V. Fraser
1986-1987	C. Michael
1987-1988	C.S. Rogers
1988-1989	N. Vant
1989-1991	R.M. Johnston
1991	L. Hanson
1991-	A. Charbonneau

When the first appropriation for roads was made in 1854, three Road Commissioners were appointed to oversee the expenditure. In 1858, the first Department was created, and it became the Department of Lands and Works under the Chief Commissioner of Lands and Works. The Ministry remained associated with Lands until 1908.

In 1908, a separate Department of Public Works (including highways) was formed and placed under a Minister of Public Works. In 1954, "highways" was split off from Public Works and a Department of Highways created under a Minister of Highways. Then in 1977, most of the Department of Public Works became a Crown corporation, with the Safety Engineering Services Division rejoining Highways to form the Ministry of Highways and Public Works.

In 1978, Transportation and Communications were added to the portfolio and the title became the Ministry of Transportation, Communications and Highways. In November 1979, Communications was moved to another portfolio and the title became the present one: Ministry of Transportation and Highways.

The roster of Chief Commissioners and Ministers responsible for highways is a distinguished one.

Waterways have always been an integral part of British Columbia's road system.

In the early days, the cheapest and simplest method of crossing British Columbia's thousands of water barriers was by ferry, and some 60 are still in operation today on 47 routes. Yale had a ferry in 1859, a makeshift barge hauled by hemp cable strung between two trees on opposite banks of the Fraser River. In 1858, a ferry operated farther north across the Fraser, where Alexandra Bridge now stands. Another ferry across the Thompson River was discontinued when Spence's Bridge was built in 1864.

There were no schedules then, and travellers sometimes had to wait a whole day for the ferryman to return from a hunting trip before they could obtain passage.

The broad mouth of the Fraser River, where the Pattullo Bridge now stands, was originally crossed by a ferry called the *K de K* , which began operation in 1884. Rates were 25 cents for a person, 50 cents for a person on horseback, and $1.75 for a wagon and team.

The "reaction" ferry provided an ingenious method for crossing swifter rivers. A permanent cable running over the river held the vessel against the current while it tacked like a sailboat from bank to bank. Some of these are still in use today in the more remote parts of the province.

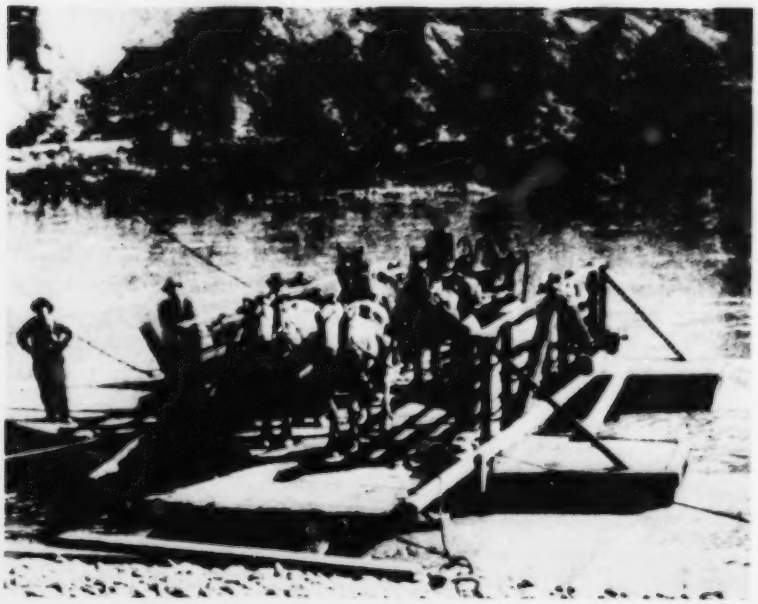
Accidental destruction of one of the reaction ferries at Big Bar, 40 miles north of Lillooet, led to the first aerial ferry. A Cariboo rancher named Shorty Schrader hooked a sort of bosun's chair to the still intact cable and pulled himself across with his arms. This ferry was used for two years.

This may have led to the design many years later of the famous North Bend aerial ferry, which operated from 1940 until 1986 when it was replaced by a bridge. The cable car ran 25 m above the river on two 4.4-cm steel cables. Although its capacity was just one car, or 40 passengers, in 1984 it carried an amazing 96,271 vehicles between Boston Bar and North Bend.

The first ferry across Okanagan Lake from Kelowna to Westbank (where a new floating bridge was built in 1958) was a scow propelled by oars and capable of carrying three heavy horses or five pack horses.

Many famous old sternwheelers, similar to the renowned Mississippi River boats in the southern United States, plied the lakes in British Columbia. One such vessel now serves as a landlocked historical marker and restaurant in Penticton.

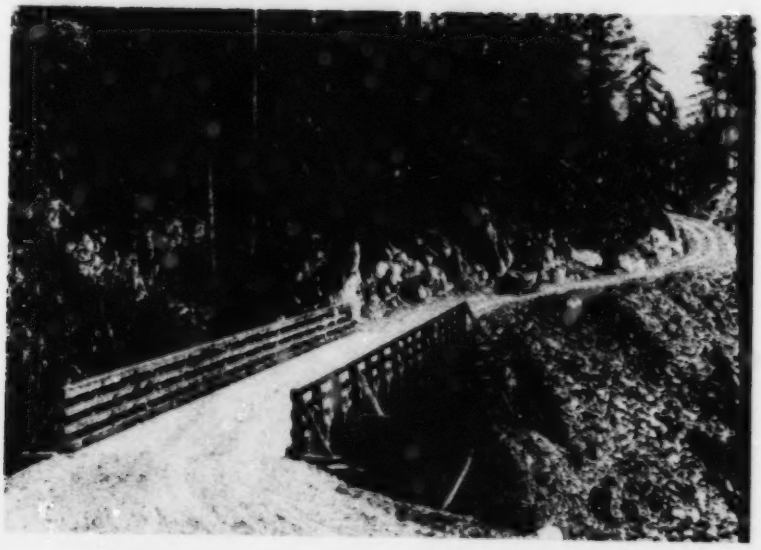
This tug and barge ferry operated on Francois Lake between 1914 and 1920.



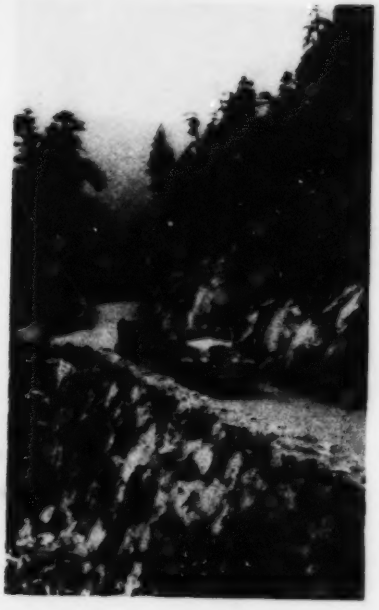
Big Bar reaction ferry on the Fraser River in 1920. Over the years, the basic design of this type of ferry has not changed and there are still six in use throughout the province.

The famed North Bend aerial ferry over the Fraser River joined the communities of Boston Bar and North Bend, about 64 km east of Hope on Highway 1. In its 45 years of operation, it carried 2,037,579 vehicles, 6,092,434 passengers and drivers and made 1,610,789 round trips.

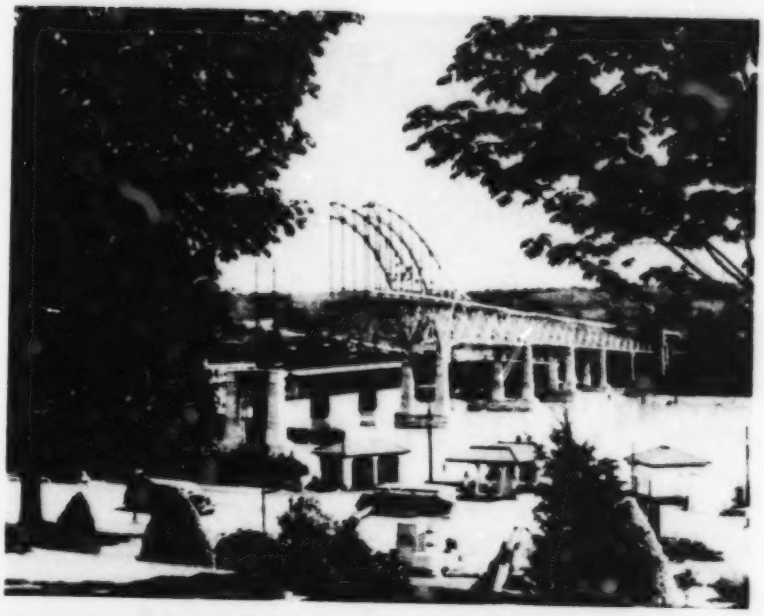
This rock cut was between Lytton and Lillooet on the Cariboo Road. The picture was taken in the mid-1920s when the road was unchanged from the wagon road built in 1863 by the Royal Engineers.



Two shots of the Malahat Drive 10 km north of Victoria around 1918. Note the right-hand-drive car. Before 1920, motorists in B.C. drove on the left side of the road.



Three pictures of the "improved" Fraser Canyon highway in the 1920s. Fourth picture (bottom right) shows the same road unchanged in the early 1930s.



Pattullo Bridge over the Fraser at New Westminster under construction around 1933.

Mount Sir Donald in Rogers Pass, Trans–Canada Highway.

Since World War II, phenomenal increases in industrial activity, population and motor vehicle registration have made highway construction and maintenance a huge undertaking.

From 1952 to 1990, passenger motor vehicle registrations went from 405,000 to 1,803,247, an increase of more than 300 per cent. British Columbia has consistently had the highest ratio of cars to people in Canada, as reflected by the traffic counts on some of B.C.'s major roads. A random sampling shows that the average daily summer traffic on the Trans-Canada Highway at the Second Narrows Bridge in Vancouver was 36,000 in 1965, 58,000 in 1970, and 103,126 in 1990.

In 1990, the British Columbia highway system consisted of 43,292 km of road. Of this total, 21,904 km was paved and 21,388 km unpaved. In 1946, the entire budget for all ministries in British Columbia was $37 million. More than seven times that amount was spent on construction of the new Okanagan Connector highway alone.

The Connector was completed in 1990 at a cost of $225 million in 1987 dollars.

The modern age of highway building begins.

The post-war highway construction boom included the John Hart Highway, a fairly low-standard gravel road which joined Prince George to the Peace River area by about 1950. The Hope-Princeton Highway, completed about the same time, was the first modern highway to be built into the interior from the coast.

HIGHWAY 1—
THE TRANS-CANADA HIGHWAY.

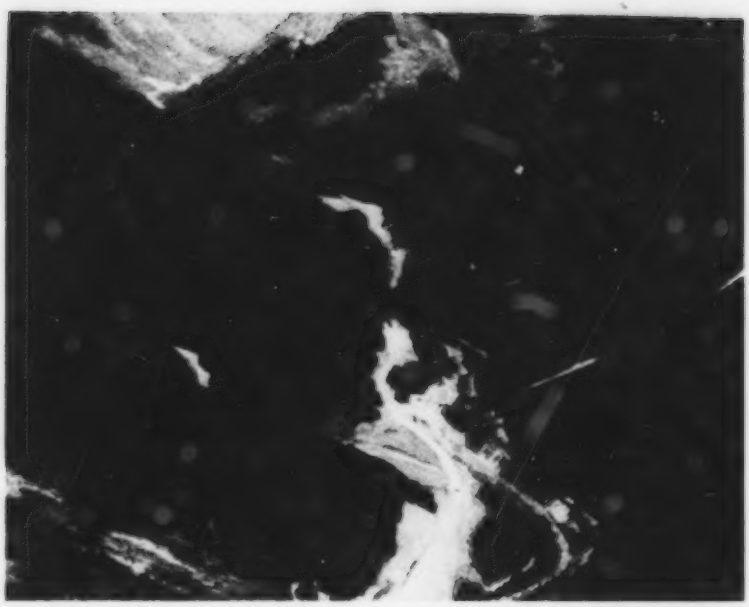
One of the most important early events in this period was the completion and opening of the new Rogers Pass section of Highway 1 between Revelstoke and Golden, built under the Trans-Canada Highway Agreement on a cost-sharing arrangement with the federal government.

This 147-km section of highway cost $50 million in all and opened up some of the most beautiful and spectacular mountain country on the continent. Apart from the tourism aspect, the new route cut about 160 km and seven hours of travelling time off the old Big Bend loop. When the new highway was opened on July 30, 1962, traffic counts immediately increased tenfold. Traffic counts have continued to increase since that time.

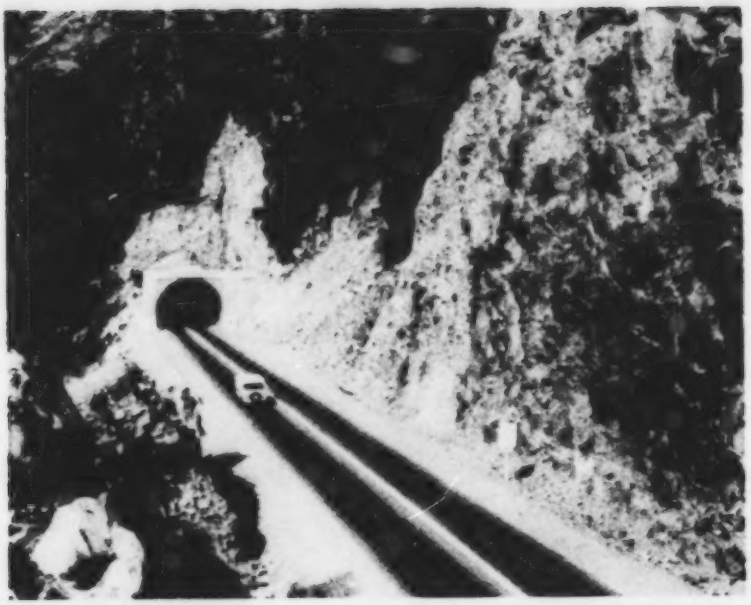
The first phase of the long and extremely difficult work on the Fraser Canyon section of Highway 1 was completed in the late 1960s. The two most recent tunnels through rock bluffs were opened to traffic in 1966. A major rock scaling project was carried out in 1974 and 1975 at Hells Gate and further improvements and construction of additional lanes have continued since that time. There are seven tunnels in all, ranging in length from 91 m to 640.5 m.

The new Alexandra Bridge over the Fraser River, opened in 1962, was significant in that the 35,000-pound load limit was eliminated, allowing trucks to travel at legal loads through this section of Highway 1. Some of the most difficult and expensive highway construction work in Canada was undertaken in this spectacular Fraser Canyon gorge, the same general route used by the Royal engineers to build the Cariboo Highway more than 100 years ago.

The year 1964 saw another important event in British Columbia's highway development with the opening of the new Port Mann Bridge and remaining sections of Highway 1 (then called Route 401) in the Lower Mainland.



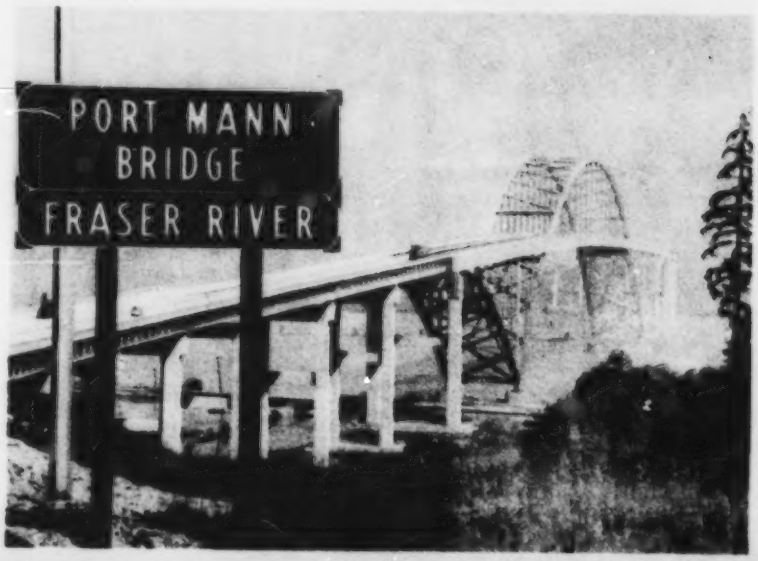
Two views of Highway 1 in Rogers Pass. Above, a spectacular aerial shot shows Lanark snowshed. Below is a section along the Illecillewaet River.



Typical of difficult construction on Highway 1 in the Fraser Canyon are the Yale Tunnel (top) and Saddle Rock Tunnel farther north.

Anderson River Bridge.

Rock cut, Fraser Canyon.



Spectacular Port Mann Bridge over the Fraser River on Highway 1, 19 km east of Vancouver. The giant structure is 2,104 m long and 44 m above high water.

Officially opened June 12, 1964, the total length of the sections — from the Second Narrows Bridge to Mount Lehman Interchange, and "C" Street Interchange to the Vedder River — was 75 km, with an additional 89 km of interchange connections and frontage roads. It was built at a cost of some $77 million (1964 dollars), and there were 63 separate contracts in this section, involving 40 prime contractors.

Three sections — Taylor Way to Second Narrows Bridge, Mount Lehman to "C" Street, and Vedder River to Agassiz Junction — were opened earlier.

The total length from Taylor Way to Agassiz Junction, including these sections, is 121 km plus 105 km of interchange connections and frontage roads. The total cost of the whole 121 km was about $125 million.

Other improvements to the Trans-Canada Highway were carried out through the 1970s, including a new four-lane section just north of Victoria, various new four-lane sections on Vancouver Island between Victoria and Nanaimo, reconstruction from Horseshoe Bay to Taylor Way in West Vancouver, additional lanes on various sections through the Fraser Canyon and east to Kamloops and completion of the Kamloops Bypass.

Highway 1 near Vancouver city centre.

COQUIHALLA HIGHWAY

Between 1979 and 1990, a new and even more ambitious route was built into the interior from Hope through the Coquihalla Pass.

The Coquihalla Highway was constructed in three phases. Phase 1, from Hope to Merritt, was completed in 1986. This involved some 137 km of heavy construction through a mountain pass and hill country. Phase 11, from Merritt to Kamloops, opened in September 1987. The third phase, the Okanagan Connector, running from Merritt to Peachland, represented a major construction and engineering challenge.

Completed in 1990 at a cost of $225 million (1987 dollars), the route climbs to a summit of 1,740 m and drops quickly down a mountainside through the Trepanier Valley to Peachland.

The next step to work towards is the widening of the Trans-Canada Highway to four lanes throughout its full length across British Columbia.

OTHER IMPORTANT HIGHWAY CONSTRUCTION ACROSS THE PROVINCE

SOUTHERN ROUTES:

In 1962, the Vancouver/Blaine Freeway (then called Deas Tunnel Throughway) from Oak Street Bridge to the United Sates border was officially opened. This four-lane, 40-km divided freeway, including the Massey Tunnel, cost approximately $57 million.

An important completion in 1964 was the Salmo-Creston section of the Southern Trans-Provincial Highway. This 67-km section attains the highest elevation of any arterial highway in Canada, an altitude of 1,769 m. This is a "cut-off" in the truest sense of the word, and provides an alternative to the 160-km route through Nelson and along Kootenay Lake.

Shown under construction in 1985, this section of the new Coquihalla route borders the Coquihalla Lakes, some 55 km northeast of Hope.

Also in the '60s, the first major obstacle on Highway 3 was overcome when the road section from Christina Lake to Kinnaird was opened in October of 1962. This 74-km highway replaced the mountain gravel road that had been the old Cascade route and its alternative, a 118-km trip through the United States via Kettle Falls. Other work on Highway 3 included widening and paving portions of the Hope-Princeton Highway, and installing passing lanes on long grades.

In 1965, the new Richter Pass route from Keremeos to Oliver was opened, shortening the trip through Kaleden and Okanagan Falls by 32 km. Other sections of Highway 3 were also reconstructed from Greenwood to Grand Forks, Kitchener to Cranbrook, and several areas between Cranbrook and the Alberta boundary at Crowsnest Pass.

Highway 3A between Castlegar and Nelson was completely rebuilt, and a new route from Castlegar to Thrums, including bridges across the Columbia and Kootenay Rivers, was also completed. This route allows the Castlegar Ferry to be bypassed.

In 1988, work was begun on the reconstruction of Highway 97 from the U.S. border to the Trans-Canada Highway, including Highways 97A and 97B. The project includes widening Highway 97 to four lanes from Kaleden to Vernon.

THE INTERIOR SOUTH.

The upgrading of the Trans-Canada Highway has continued in several areas, with construction of new four-lane sections east of Kamloops, from

Barnhartvale to Campbell Creek, in Salmon Arm and eastward from Canoe to Ann's Bay. A study has been conducted to examine options for upgrading a 52-km section from Donald to Yoho National Park.

THE NORTHERN INTERIOR.

In the '60s and early '70s, work was completed on two of British Columbia's largest highway projects — the extension of Highway 16 east from Prince George to McBride with reconstruction to the Alberta border, and the reconstruction of Highway 5 from Kamloops to Tete Jaune Cache.

Covering a total distance of about 704 km, these projects involved many highway and bridge contracts with a total cost of about $97 million.

In 1964, major reconstruction of Highway 16 began between Prince George and Prince Rupert. Of the total 728 km, most were reconstructed, and all have been paved.

Further upgrading of the portion of Highway 5 just north of Kamloops continued, and late in 1984 a new four-lane bridge over the North Thompson River was officially opened. Costing $16.3 million, this impressive 450-m structure provides a connection from North Kamloops to Highway 5.

In 1987, British Columbia and the federal government signed a three-year, $36-million cost-sharing agreement to improve safety on Yellowhead Highway 16 and Highway 5. This included reducing steep grades, widening sections of the highways, and eliminating a number of sharp curves.

A view of the Hudson's Hope–Chetwynd Highway that leads to the W.A.C. Bennett Dam on the Peace River.

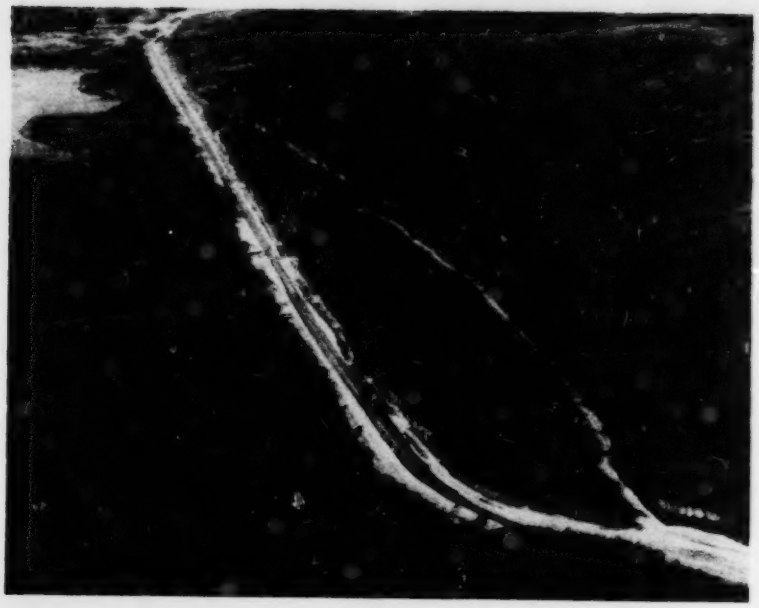
PEACE RIVER COUNTRY.

After an extensive 10-year reconstruction program, the paving was completed on the 409-km John Hart Highway between Prince George and Dawson Creek in 1976. A new road and a bridge over the Peace River were also built to connect Chetwynd and Hudson's Hope, and the road from Hudson's Hope to Fort St. John was rebuilt and paved.

In 1988, work began on a major new crossing of the Beatton River to assist farm-to-market and industrial traffic in the North Peace region of British Columbia. The $22-million Beatton Crossing project involved construction of 11 km of two-lane road, six bridges, and a climbing lane for trucks. The new route replaced a portion of Road 103, south of the Beatton River.

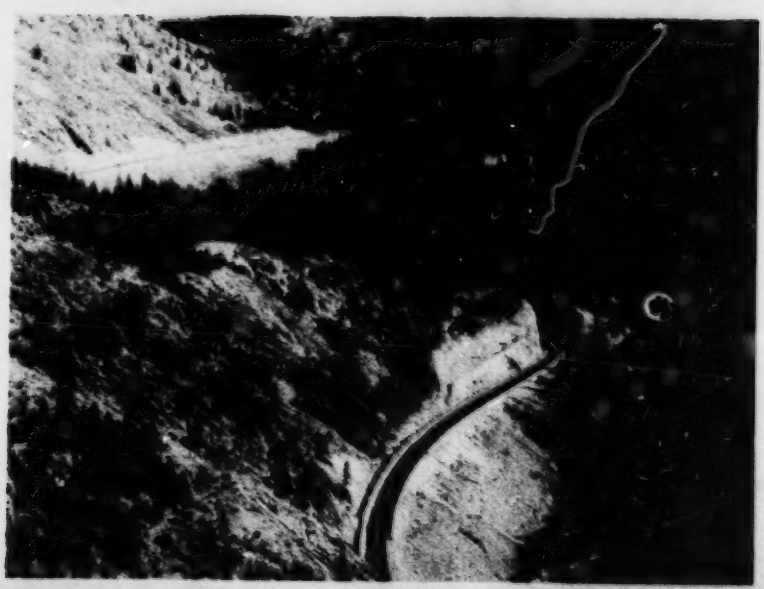
NORTH TO ALASKA.

In 1972, the 638-km link-up of the Stewart-Watson Lake Highway was completed. Designated Route 37, it continues south from Meziadin Lake to Kitwanga. A circuit can now be made via Highways 37, 97 and 16 to the point of commencement. Further upgrading and paving of this major alternative to the Alaska Highway has continued. By 1991, 578 km or 77 per cent of the total

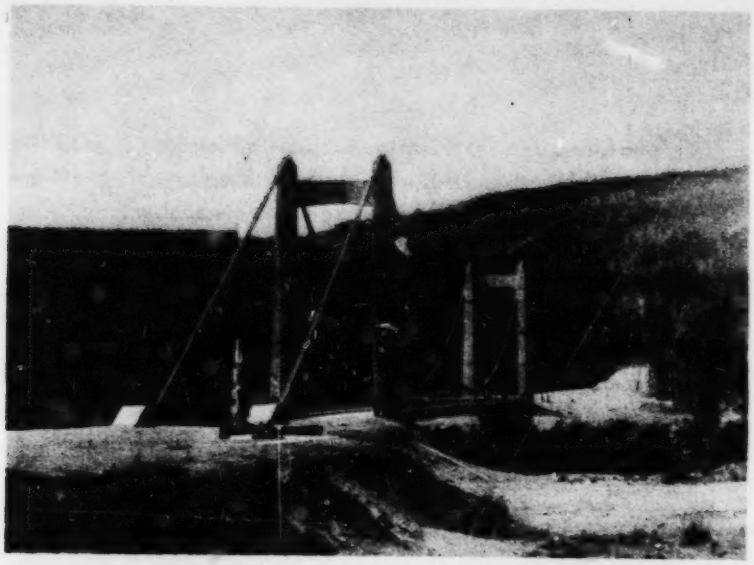


Yellowhead South Highway 5 along the North Thompson River near Valemount.

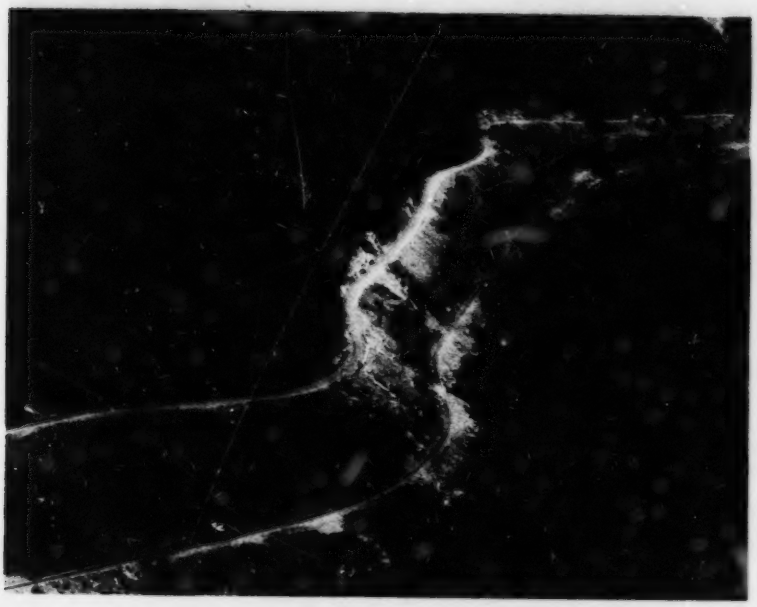
Section of Yellowhead Highway 16 between Hazelton and Moricetown. The Highway runs 1,104 km from Prince Rupert to the Alberta border.



This rugged mountain pass on the Salmo–Creston section of Highway 3 attains an altitude of 1,769 m, the highest in Canada for a main highway.



Peace River Bridge on Highway 29 near Hudson's Hope.



Cost for 34 km of the Squamish Highway when it was built in the early 1960s was $11 million. Planning to upgrade the route, now called the Sea-to-Sky Highway, began in 1989.

Section of Highway 19 between Campbell River and Port Hardy on Vancouver Island, completed in 1978.

distance from Kitwanga to the Yukon border had been paved or seal coated.

In June 1984, history was made when the $80 million Liard Highway was officially opened. Running 400 km from the Alaska Highway at Fort Nelson to the McKenzie Highway near Fort Simpson in the Northwest Territories, the huge project was a joint federal/provincial undertaking. British Columbia built the 137-km section from Fort Nelson to the northern border at a cost of $26 million. The federal government built the 255-km Northwest Territories section at a cost of $55 million.

1992 marked the 50th Anniversary of the Alaska Highway. British Columbia is responsible for approximately 130 km of the Canadian portion of the highway, which starts at Dawson Creek, with the federal government responsible for the remaining 850 km.

Bear Cove dock on Vancouver Island near Port Hardy. This is the southern terminal of B.C. Ferry's Prince Rupert run.

SEA TO SKY.

A new access road from Squamish, at the head of Howe Sound, to Pemberton was built and paved in the '70s. Covering a distance of about 91 km, this medium-standard road provides access to Garibaldi Park, Alta Lake, Whistler and other features of the valley. The 84-km long Duffey Lake Road, connecting the Pemberton area to Lillooet, was upgraded to a hard surface highway.

The scenic Squamish Highway follows the B.C. coastline along Howe Sound, with the B.C. Railway below. In the early 1960s, the cost for constructing just 34 km on this route was $11 million. Planning to upgrade Highway 99, now called the Sea-to-Sky Highway, began in 1989, and extensive improvements from Horseshoe Bay to Whistler have been underway since that time. A major priority has been addressing slide and flooding concerns, and aging bridges have been replaced with concrete structures. The Ministry has also conducted studies to identify alternative routes to the Whistler/Squamish area.

VANCOUVER ISLAND.

In the mid-60s, a new 50-km section of the Island Highway between Campbell River and Kelsey Bay was completed. Kelsey Bay was the original terminal of the Prince Rupert ferry route inaugurated by B.C. Ferry Corporation in May 1966. In 1970, work began on a new 48.8-km link to connect Kelsey Bay with the northern part of Vancouver Island via Woss Lake and the Nimpkish Valley to Port McNeil and Port Hardy. By 1978, this was completed, along with a new ferry terminal at Bear Cove for the Prince Rupert service and a 3.2-km connection road.

By 1982, a new 14-km four-lane section was completed north of Nanaimo, between Wellington and Nanoose. A new bypass and bridge had also been built at 17th Street in Courtenay. Other sections of the Island Highway north

of Nanaimo had been expanded to four lanes, and the first phase of a new four-lane Parksville-Qualicum Bypass was opened to traffic.

In 1988, the Ministry announced its largest-ever project: reconstruction of the Vancouver Island Highway. This involves upgrading Highway 17 from Swartz Bay to Victoria and the Trans-Canada Highway from Victoria to Nanaimo to four-lane expressways. A Nanaimo expressway and a new inland route from Parksville to Menzies Bay just north of Campbell River are also scheduled for construction.

THE CITY OF VANCOUVER.

In 1990, construction began on the eagerly-awaited Cassiar Connector, a $115-million project designed to provide better movement of traffic along the Trans-Canada Highway between Vancouver and the North Shore, as well as to provide access from the Trans-Canada Highway to the federal Port of Vancouver.

Completed in 1992, work included upgrading a 2.3-km stretch of the Trans-Canada Highway south of the Second Narrows Bridge to full freeway standard, construction of seven overpasses, 20 retaining walls, a pedestrian bridge, two major interchanges, and a 730-m cut-and-cover tunnel. This was the largest individual tender for roadworks in the history of the Ministry.

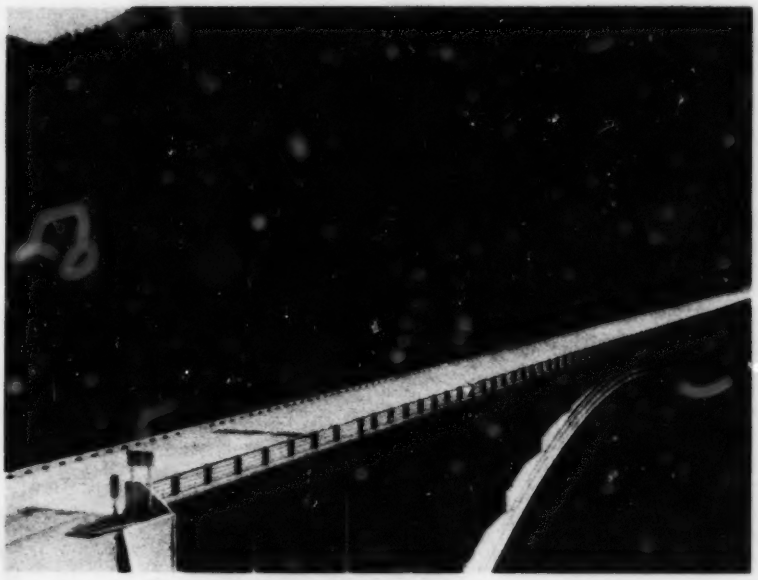
Completion of the Cassiar Connector, along with the recent upgrading of two intersections to interchanges on the North Shore, provides travellers free movement from the Alberta border to Horseshoe Bay. The Lonsdale interchange was completed in 1991, at a cost of about $22 million. The Westview interchange is scheduled for completion approximately three years later.

WORKING TOGETHER WITH B.C. HYDRO.

An important function of the Ministry has been to cooperate with B.C. Hydro in the development of roads in hydro-electric projects. Two prime examples of this kind of joint effort are the 64-km road between Chetwynd and Hudson's Hope and the award-winning bridge over the Peace River.

Earlier, the Ministry reconstructed and paved about 19 km of new highway from Hudson's Hope to the site of the W.A.C. Bennett Dam. It rebuilt the 136-km western leg of the old Big Bend Highway to service the Mica Dam during construction, and to provide access to the area for the public. The Ministry has also completed a $120-million construction program to relocate large sections of the highway above reservoir levels after a second storage dam was built downstream. At the Duncan Lake hydro development, improvements were made to the Kaslo-Lardeau Road as part of the project.

British Columbia's topography means highway building must include bridges, tunnels and, above all, ingenuity.



Paulson Bridge on Highway 3 is between Grand Forks and Castlegar. Crossings of deep canyons are unavoidable in British Columbia's highway system.

British Columbia's varied landscape and numerous waterways truly make this bridge country, with more than 2,700 crossings in the highway system. Since 1989, many of the 600 bridges that are over 40 years old or made of wood have been replaced by modern concrete structures in an ongoing bridge replacement program. In addition, bridges built before modern earthquake-resistant design specifications were in place have been identified for retrofitting.

Over the past 30 years, the Ministry has built more than 1,025 bridges. On Highway 1 alone the Ministry built, among others, the 300-m Columbia River Bridge at Revelstoke, the 488-m Alexandra Bridge in the Fraser Canyon, the 213-m Nine Mile Canyon Bridge standing 92 m above the river, and the 137-m Spuzzum Creek Bridge.

The Port Mann Bridge is a spectacular structure with an overall length of 2,100 m — the world's longest high-level, stiffened, tied-arch bridge, the longest in the world with an orthotropic deck, and the first in North America to have an orthotropic plate deck. The cost in 1964 was $25 million; today, it would be over $100 million.

Modern standards of highway construction demand a minimum degree of curve, good grades and adequate width. To achieve these standards in mountainous country, engineers have to solve some intricate problems.

The Fraser Canyon section of Highway 1 north of Yale includes seven highway tunnels up to 640-m long. Cut through solid rock bluffs, the tunnels have concrete-lined arch roofs, roadway surfaces that extend to 8.15 m, plus sidewalks and lighting. Where the old road went around obstacles, the new one must go through them to meet the required standard.

Between Lytton and Spence's Bridge, maintenance of a reasonable standard presented another problem. The old road was sandwiched in between the rail-

way and the river. In order to widen it to proper specifications, contractors had to move out into the river using retaining walls. In the 22-km section from Tank Hill to Spence's Bridge, there are 27,900 square metres of steel-bin wall and 26,740 cubic metres of concrete. This section runs for about 1,372 m and the retaining wall varies in height up to 9.75 m. In another section, 1,470 m of retaining wall is required at a long curve of the river. About 19,100 cubic metres of concrete were required here.

Six of the longest bridge crossings were built originally for the British Columbia Toll Highways and Bridges Authority, a Provincial Government agency long since dissolved. These structures are now administered by the Ministry of Transportation and Highways and have not had tolls on them for 20 years. Among them is the four-laned 780-m tunnel under the Fraser River at Deas Island connecting Vancouver to the United States border via Highway 99.

Opened in 1962 at a cost of around $25 million, the George Massey tunnel was the first of its kind in North America and among the first to use the method of construction in which concrete sections are built in a drydock, floated into position, sunk in a prepared trench and joined together. The tunnel is capable of handling 7,000 cars an hour. In 1989, a counterflow system was introduced to meet increasing traffic demand in the tunnel. During rush hour, three lanes operate in the peak direction, with one lane taking the opposing traffic flow.

The Oak Street Bridge was opened in June 1957. The structure is 1,840 m long with four lanes and the cost was around $9 million. The bridge connects Vancouver to Lulu and Sea Islands. When first opened, it was carrying average daily traffic of about 18,000 cars. By 1990, it was carrying more than 82,000 cars daily.

The Richter Pass section of Highway 3, between Keremeos and Osoyoos, passes through the beautiful dry-belt section of British Columbia's interior region.

The Agassiz-Rosedale Bridge was opened in November 1956. This two-lane, cantilevered bridge across the Fraser River 96 km east of Vancouver is 1,869 m long and cost about $5 million.

The 1,293-m, six-lane Second Narrows Bridge across Burrard Inlet was completed early in 1959 at a cost of about $25 million.

The 732-m Kelowna Bridge across the Okanagan Lake between Westbank and Kelowna combines a rock-fill causeway and a floating pontoon bridge. It cost about $10 million and was completed in 1959. Planning is now underway to improve both the Second Narrows and Kelowna bridges because demand has now exceeded capacity on both.

In late 1957, the 629-m cantilevered Nelson Bridge across the West Arm of Kootenay Lake at Nelson was opened. Cost of this bridge was about $4 million.

In 1954 the Lions Gate Bridge, crossing between Vancouver and the North Shore, was purchased from the Guinness companies which had built it. Work was later completed on two large new crossings of the Fraser River in the Lower Mainland area: the Knight Street Bridge, opened in January 1974, and the Mission Bridge in July 1973.

The Vancouver–Blaine Freeway, Route 99, is built to full freeway standard over the lowlands of the Fraser River delta south of Vancouver.

The Knight Street Bridge, which replaced the old Fraser Street Bridge, is actually two separate bridges with a combined length of 1,436 m. Travelling south from Vancouver, motorists first cross a 238-m, pre-stressed concrete span over the north branch of the Fraser River North Arm to Mitchell Island. This part of the crossing is six lanes with the two outside lanes joining off and on-loops for Mitchell Island. Then the second part of the bridge, a 1,198-m structure of pre-stressed concrete, crosses over the south branch of the Fraser River North Arm from Mitchell Island to Lulu Island where it joins the existing road network.

The Mission Bridge is 1,127 m long, crossing the Fraser River southwest of the City of Mission and east of Matsqui Island. It is a four-lane structure with full navigational clearance for river traffic, and consists of three orthotropic steel box-girder main spans, six 61-m steel-plate girder flanking spans, and 12 pre-stressed concrete girder approach spans, each 41 m long. In 1984, a new $6.7 million railway overhead at Mission became part of the Mission Bridge system.

Among the many bridges constructed during the late 1970s and early '80s were the Foothills Boulevard at Prince George, the McPhee Bridge over St. Mary's River near Cranbrook, the 400-m Fort Nelson Bridge on the Liard Highway and the famed Bridge of 23 Camels over the Fraser River at Lillooet, which replaced an old suspension bridge built in 1911. In addition, several concrete bridges were built on the Squamish Highway.

In 1986, the world's longest cable-stayed span, the Alex Fraser Bridge, was completed as part of a new Fraser River crossing system at Annacis Island. Constructed at a cost of $400 million, the bridge has a main span of 465 m and runs 2,525 m in length. Each of its towers stands approximately 50 stories high. To build the connecting roads and freeways that feed the bridge, some seven million cubic metres of sand had to be dredged from the Fraser River. The complete Annacis system includes 33 km of new multi-lane highway (Highway 91) connecting New Westminster with Highway 99 to Richmond, 37 bridges and overpasses, 13 complete or partial interchanges, and another 16 km of connecting roads.

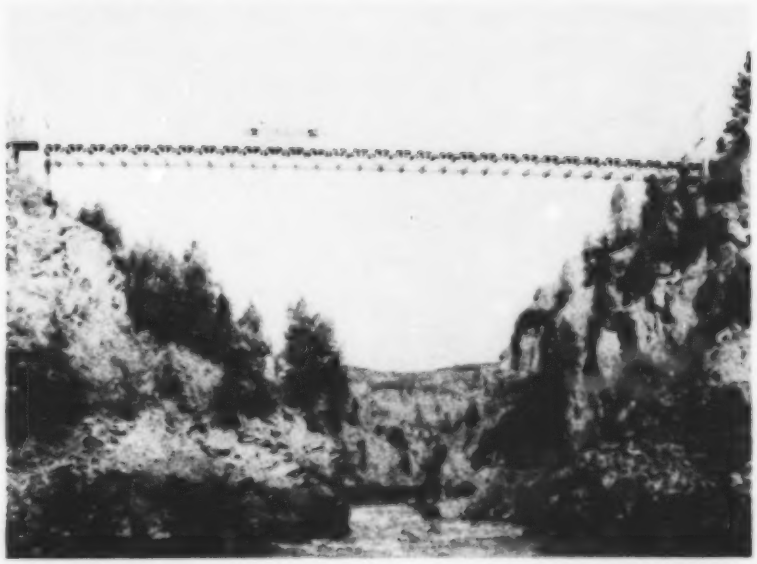
Port Mann Bridge over the Fraser River on Highway 1 during construction. The structure is 2,100 m long and 45 m above high water.

This section of the Trans-Canada Highway along the Thompson River swings out on high fill in order to maintain alignment and overpass the railway.

The beautiful Columbia River Bridge at Castlegar is one of several innovative designs used on B.C.'s highway system. The bridge is 336 m long and 60 m high.

Sometimes old bridges must be destroyed to make way for new ones. This well–used Howe Truss met a violent end at Sooke on Vancouver Island after replacement by a new steel and concrete structure upstream.

Use of the single–column pier is shown in the design of this highway bridge over the Thompson River near Spence's Bridge. Angled across the river to maintain the 90 km/h alignment, the bridge is on Highway 1, 304 km east of Vancouver.

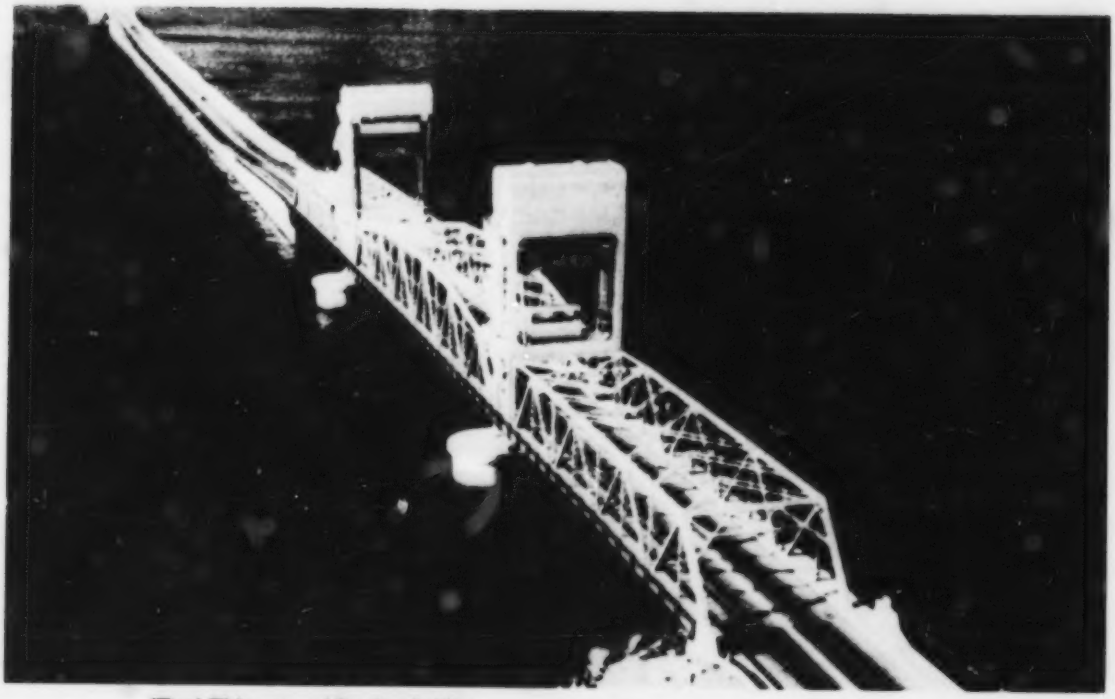


This suspension span over the Hagwilget Canyon is a local bridge near New Hazelton and Highway 16.

Other large bridges built in the mid to late 1980s included the Dry Gulch, Ladner and Niclum Creek Bridges on the Coquihalla Highway, the Alexander Creek Bridge on Highway 3 east of Hope, the Clayhurst Bridge over the Peace River and the Yellowhead-Fraser Bridge on Highway 16 at Prince George.

In late 1957, the 629-m cantilevered Nelson Bridge across the West Arm of Kootenay Lake at Nelson was opened. Cost of this bridge was about $4 million.

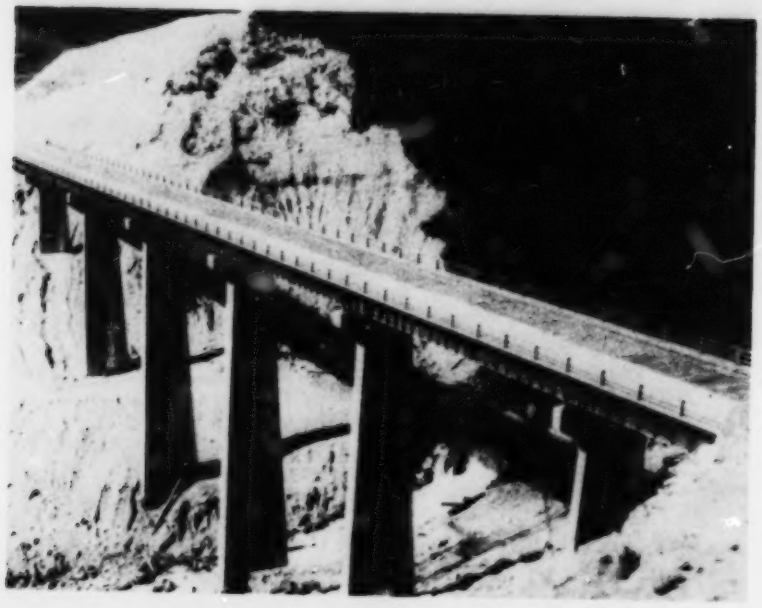
Disappearing under the Fraser River, Highway 99, also called the Vancouver–Blaine Freeway, crosses through the Massey Tunnel (formerly Deas Island Tunnel).



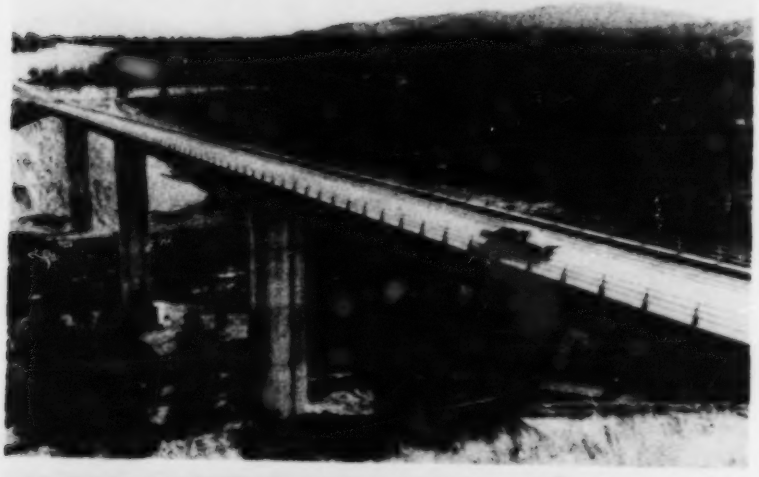
(Top) This unusual floating bridge was made necessary by the depth of Okanagan Lake. The combination causeway, floating bridge, and lift span joins Kelowna and Westbank on Highway 97.

(Right) Artist's conception of the Knight Street Bridge at Vancouver.

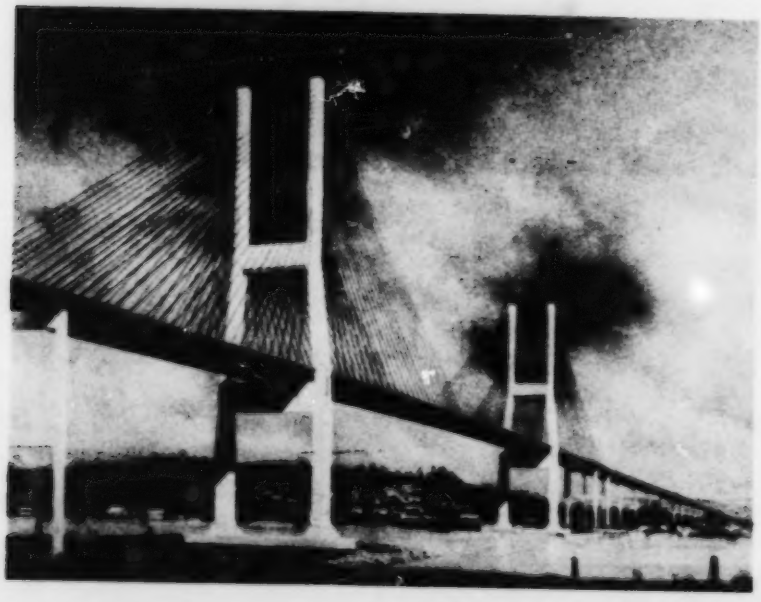
(Bottom) Downie Creek Bridge on Highway 23 between Revelstoke and Mica Creek is a beautiful combination of form and proportion.



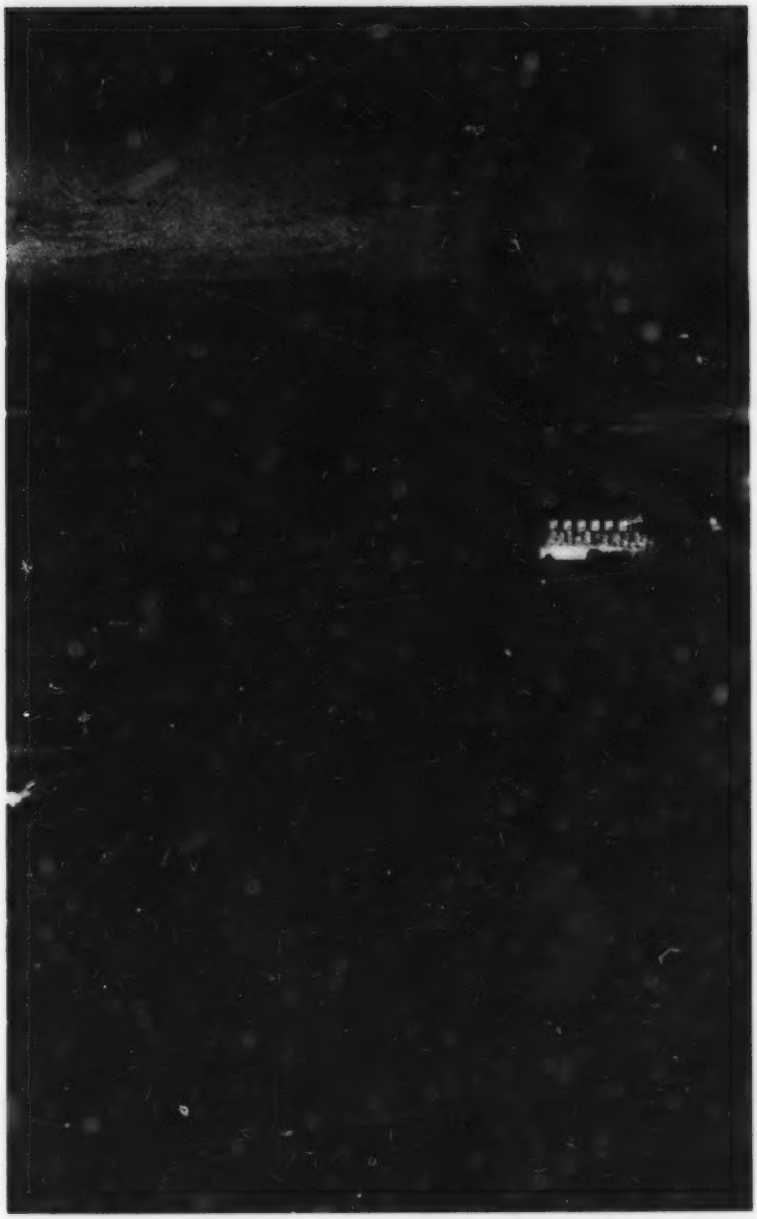
Silver Tip Falls Bridge on the Revelstoke to Mica Creek Highway has an over-all length of 190 m and is 8.5 m wide.



McPhee Bridge on Highway 95A, 10 km north of Cranbrook, is typical of the clean new bridge designs in concrete.



Shown is the new 930-m Alex Fraser Bridge over the Fraser River. The 465-m main span of the bridge is the longest of its type in the world.



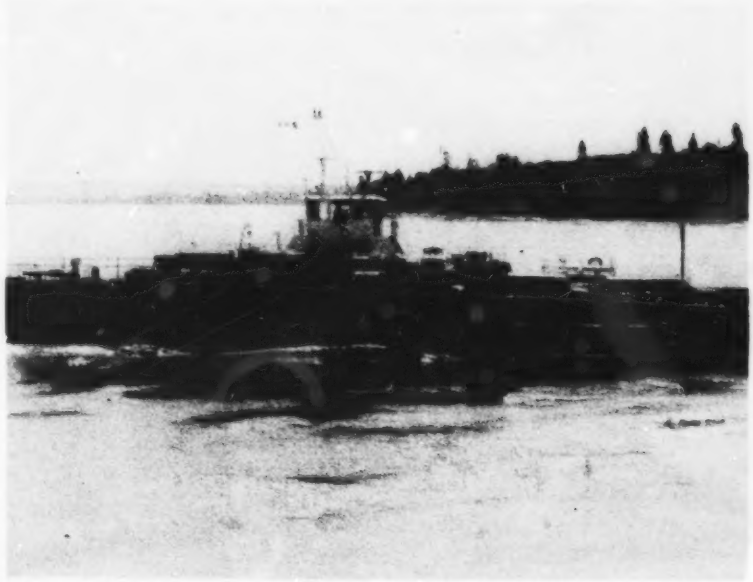
Highway 91, part of the Annacis road system, is a four-lane modern highway.

Some of British Columbia's highways pass over the sea.

British Columbia is a coastal province with about one-seventh of its total population living on Vancouver Island, a number of offshore islands between Vancouver Island and the Mainland, and a great many lakes and rivers in its interior regions.

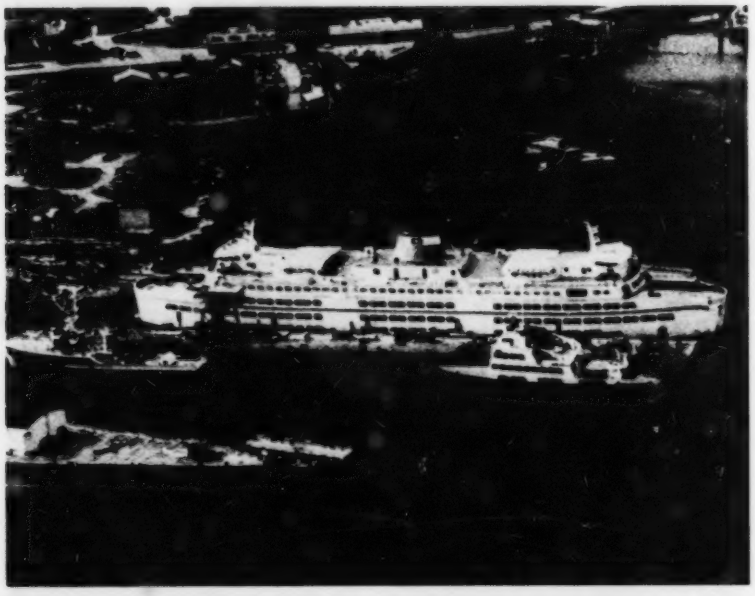
The province is therefore very much in the ferry business with some 60 ferries operating on 41 routes. These include 21 ferries on 16 inland freshwater routes run directly by the Ministry and 40 vessels on 25 routes run by the B.C. Ferry Corporation, a Crown agency.

In October, 1985, the B.C. Ferry Corporation took over the Ministry coastal ferries. This added 13 vessels, 10 ferry routes and 437 staff to the B.C. Ferry fleet. The Ministry retained those ferries operating in the interior of the province on various lakes and rivers. In 1991, the freshwater fleet carried more than 5.5 million passengers and 2.9 million vehicles.

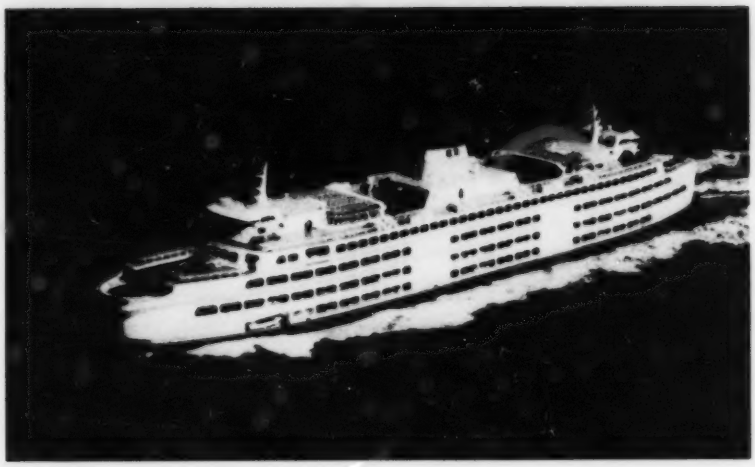


British Columbia not only builds and maintains highways but, as a coastal province with hundreds of lakes and rivers, it also operates some 60 ferries on 41 routes, ranging from one-car cable ferries to 190-car vessels 130 m long.

Growth of the B.C. Ferry Corporation operation is said to be almost unprecedented in peacetime shipping. In June 1960, there were two ships, two terminals, and 225 employees. By 1991, the service had 40 vessels and 2,800 permanent employees. During 1990-91, the B.C. Ferry Corporation system carried 19.8 million passengers and 7.7 million vehicles.



The 25-car "Comox Queen" is dwarfed by the 362-car "Queen of Cowichan", one of the more recent additions to the B.C. Ferry fleet, shown in this aerial photo at Esquimalt Harbour near Victoria. The big 6,650-tonne, 140-m long ferry was receiving finishing touches before going into service in 1976. One–quarter its length and one–tenth its tonnage, the "Comox Queen" was in for annual refit. By coincidence the Canadian Armed Forces minesweeper, left, is also named "Cowichan."



One of the larger British Columbia "C" class ferries is seen entering the terminal at Horseshoe Bay after its run from Nanaimo on Vancouver Island.

In this province, highways and transportation are a diverse responsibility.

The British Columbia Ministry of Transportation and Highways has 2,700 full-time employees. The Ministry is responsible for planning, developing and maintaining the provincial highway system, as well as developing the provincial transportation network including transportation by rail, transit, air, water and road.

One of the major responsibilities of the Ministry is to oversee the maintenance of roads and bridges throughout the province's 28 highway districts. This includes pavement patching, snow removal, roadside mowing and brushing, litter collection, bridge cleaning, and highway accident response. In 1988, these services were privatized with the aim of protecting the safety of the travelling public, providing the service more efficiently and creating local employment opportunities.

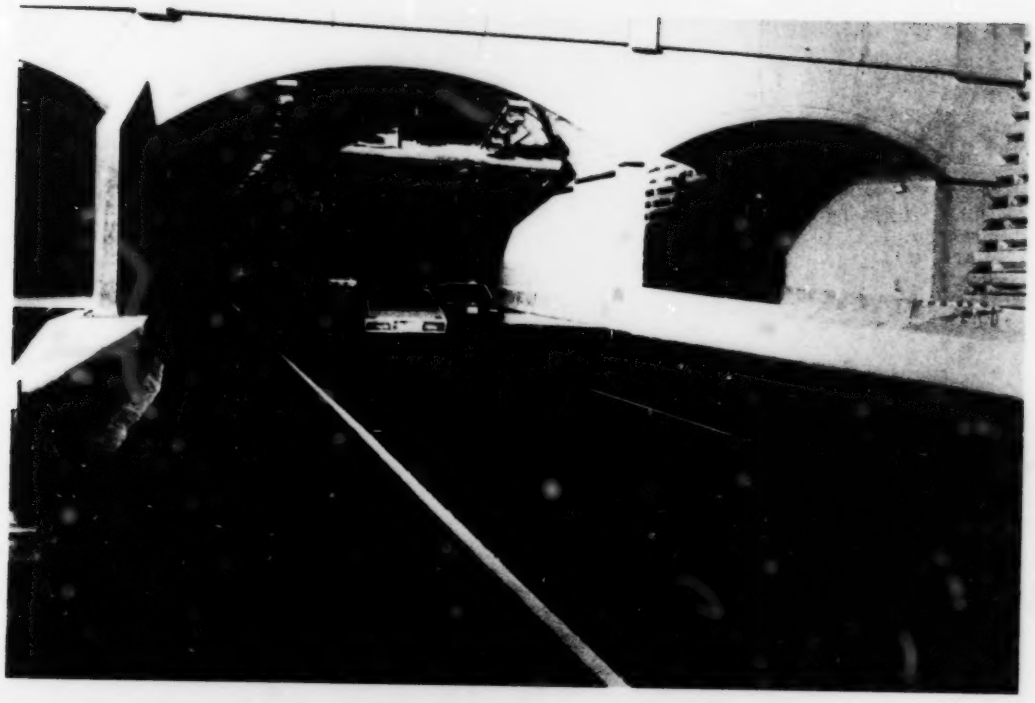
A competitive bidding process was developed to select qualified private contractors in each of the highway service areas. The Ministry monitors the performance of each maintenance contractor to ensure strict standards are met in each of the 28 contract areas.

The Ministry of Transportation and Highways is under the direction of the Minister of Transportation and Highways, who is responsible to the Executive Council and the Legislature. Immediate supervision is under the Deputy Minister, who interprets policy to the Ministry and is also head of administration. For the Highways wing of the Ministry, there are three Assistant Deputy Ministers, one Executive Director, and technical and administrative support staff in Victoria including design and survey, construction, bridge, paving, traffic, planning, and geo-technical and materials branches. They support Regional and District staff who, through a decentralized system, manage the work.

This turbine-powered blade snow plow, shown here on the Salmo-Creston section of Route 3, was the only one of its kind in the world. The machine was built by Ministry of Highways mechanics who installed a Pratt and Whitney ST6–A turbine engine. Though the unit weighed 40,000 pounds, the little 130 kilogram turbine could drive it up a seven per cent grade at 70 km/h while plowing snow! The machine is now out of service but other equipment has been developed to meet the high–speed plowing needs on the province's mountain passes.

TRANSPORTATION REGIONS
1. South Coast
2. Thompson/Okanagan
3. Kootenays
4. Central/North East
5. North West
6. Vancouver Island
STIKINE
NORTH PEACE
NECHAKO
SOUTH PEACE
BULKLEY NASS
SKEENA
LAKES
FORT GEORGE
NORTH CARIBOO
ROBSON
CENTRAL CARIBOO
SELKIRK
HOWE SOUND
SOUTH CARIBOO
THOMPSON
OKANAGAN SHUSWAP
NORTH ISLAND
NICOLA
CENTRAL KOOTENAY
EAST KOOTENAY
SOUTH OKANAGAN
KOOTENAY BOUNDARY
FRASER VALLEY
CENTRAL ISLAND
SOUTH ISLAND
LOWER MAINLAND
HEADQUARTERS
VICTORIA

The Okanagan Connector portion of the Coquihalla Highway, running from Merritt to Peachland, presented major construction and engineering challenges.



The Cassiar Connector, completed in 1992, speeds the movement of traffic along the Trans-Canada Highway between Vancouver and the North Shore, and provides improved access to the federal Port of Vancouver.